COUNTDOWN

BY CIX

"WHAT IS THE BEST THING THAT HAPPENED THIS DECADE?"

The 2010's. Ahh, what a time.

To commemorate the end of a decade, let us go over all the major events that occurred in the past ten years, ordered by **mathNEWS** issue:

v112i3–v112i4 — The 2010 Olympics are held in Vancouver, culminating with the Golden Goal (ily sidney)

v117i3 — M3 opens, marking the start of a new era in the Department of Statistics and Actuarial Sciences, and the use of a hideously oversized classroom by other faculties.

v119i1 — Feds (aka WUSA) loses control of Fed Hall to the university, resulting in a mass migration of students to Wilf's.

v120–v121 — The world ends. UWaterloo students didn't notice a difference as it was during exam season anyways.

v122i1 — Rob Ford's crack habit becomes public. We didn't write anything about that, but we just thought you'd like to know.

v130i5 — George Lambrou comes in as editor, heralding a new era of **mathNEWS**.

v130i7 — **mathNEWS** gets a new horizontal layout, thanks to George.

v131i4 — **mathNEWS** returns to its vertical layout, thanks to George realizing his mistake.

v133i4 — **mathNEWS** is redesigned. To all our critics: the paper literally tastes the same, I've tested it, please stop complaining.

v136i6 — George leaves. Goodbye, George (and congrats on graduating!)

v139i2 — A forty-page issue of **mathNEWS**⁉ Yes. After several fatalities in the editorial team, it gets published on time. RIP.

v140i6 — ~~Feds~~ is rebranded. ME-SA, YOU-SA. WE-SA, **WUSA**!

terrifiED
Editor, **mathNEWS**

WALDO@<3.LE-GASP.CA	I graduated :D
PIKACHU.EXE	Coming to the realization that CS is not for me and becoming happy with what I have: everyone around me, my math program, etc.
HONK	Accepting my offer to Waterloo.
UOFT	Rejecting my offer to Waterloo.
SANDWICH EXPERT	Feds rebranding as WUSA!
DERIVING FOR DICK	Discovering **mathNEWS**
DAWDLING	C++14
DAVID JAO	Birth of Ronald Reagan
YELLOW PIGS	Finding my research area.
MARINE WHYOLOGIST	Finding my research orca.
ASMODEUS	This decade
CY	*My Little Pony: Friendship is Magic* began and ended
GIRAFARIG	The Thinkpad X220 came out
BOLDBLAZER	Bernie Sanders, Pewdiepie, Pokémon Go
BEYOND META	The friendships I maded
XAVIENTOIS	**mathNEWS** Redesign (we have consistency!)
FINCHEY	I was born. That bitch Ronald Reagan has NOTHING on me.
AUTOWIRED	Rick & Morty Season 3
UW UNPRINT	I came here and became a better version of myself. At least, I like to think so.
CLARIFIED	Somewhere along the way, I grew into a person that 2010 me would think was cool. All I'm missing are bright red streaks in my hair.
TERRIFIED	I graduated (highschool)!

ARTICLE OF THE ISSUE

If there's one thing that gets readers, it's celebrity feuds. Like Tupac and Biggie before us, our generation's feud continues in *Jao Versus Ken: A Refutation,* by supermagictesseract.

Come to MC 3030 to claim your prize. If Jao turns up mysteriously shot in Las Vegas, you know what happened. (obviously he's writing raps with Tupac at his beach villa).

~~UW Unprint~~ *clarifiED*
Editor, **mathNEWS**

Do credited ghostwriters just become normal writers?

CLARA XI, mathNEWS EDITOR FOR FALL 2019
ALONG WITH JAMIE ANDERSON, TERRY CHEN, AND JOSH RAMPERSAD

WUSA & GSA BRING EXPANSIONS TO MENTAL HEALTH COVERAGE TO UWATERLOO STUDENTS!

Waterloo, ON – November 26, 2019 – The Waterloo Undergraduate Student Association (WUSA) is excited to announce additional mental health support for University of Waterloo students at no additional cost, as part of one of the most comprehensive updates to a student healthcare plan in Canada.

On Monday, November 25, The Health Plan Oversight Committee voted unanimously to expand student healthcare coverage. WUSA and the Graduate Student Association (GSA) worked extensively with UW Campus Wellness and StudentCare to re-evaluate our insurance coverage offerings. The health plan expansion will further recommendations laid out in the President's Advisory Committee on Student Mental Health (PAC-SMH) for expanding healthcare funding and developing better referral mechanisms to community partners.

Changes include:

- Addition of the EmpowerMe, a 24/7/365 confidential student assistance program designed to support mental health and wellbeing
- Doubling the annual coverage limits for mental health services under the health plan to 80% coverage for mental health practitioners to a new total of $800.00 per calendar year
- Expanding the scope of allowed mental health practitioners covered under the health plan to include psychologists, registered social workers, psychotherapists, and clinical counsellors
- Eliminating referral requirement from a medical doctor to have your psychological treatment covered by the health plan

The expanded coverage will broaden the scope of care and remove barriers to accessing mental health supports for students without increasing the current cost of their healthcare plan over the next two terms, with only minor increases in the fall 2020 academic year.

These changes are now approved and will come into effect on January 1, 2020, with WUSA and GSA working to have the program fully integrated with the University of Waterloo Campus Wellness over the coming terms. All part-time and full-time on-campus students will have access to this program.

Waterloo Undergraduate Student Association
(WUSA)

mathASKS 141.6
FEATURING PROFESSOR KAREN YEATS

WALDO@<3.LE-GASP.CA: WHAT GOT YOU STARTED IN YOUR FIELD? DO YOU WISH YOU HAD DONE THINGS DIFFERENTLY IN YOUR CAREER SO FAR?

I got started by doing what all your advisors will say not to do, namely going to a lesser ranked school for my PhD so my now-husband and I could stay together. We had applied to pairs of schools in various cities. I got in everywhere except MIT and he only got in to Boston University, which was our Boston pair. I ended up applying to Boston University as well, after the deadline, and got in. But now I was somewhere I hadn't expected to be, without a plan of who to work with. I had been planning to study enumerative algebraic geometry. One of their number theorists was something of an unofficial advisor at first for me, and he suggested I should take this course from Dirk Kreimer on the mathematics of quantum field theory since so much modern algebraic geometry has applications in physics. I liked the material and I liked Dirk's style as a supervisor, and I never looked back.

I think it served me well in my career since I don't do the same thing as anyone else.

UNSOPHISTICATED: WHAT IS YOUR FAVOURITE GRAPH?

K_4. It's small enough that the graph theorists don't bother fighting me for it and its Feynman period is $6\zeta(3)$ which is a nice number.

BOLDBLAZER: WERE YOU EVER STRANDED ON BURNABY MOUNTAIN OR PREVENTED FROM GOING TO BURNABY MOUNTAIN DUE TO TOO MUCH SNOW?

No, but I was once biking up and there was a bear just across the road munching on the grass. Tempting as it was to stop and marvel, I decided to calmly keep biking and hope not to attract its attention. Bears are pretty intimidating when they are only a few meters away with nothing separating them from you.

DAWDLING: WHAT IS THE WORST MISCHARACTERIZATION OF YOUR FIELD THAT YOU HAVE HEARD?

I get tired of people who think combinatorics isn't serious mathematics, but you rarely meet such people around Waterloo.

AUTOWIRED: WHAT DO YOU MISS ABOUT UNDERGRAD?

Having time for random tangents and not having people depending on me.

UW UNPRINT: HAVE YOU CONSIDERED TEACHING COMBINATORICS & DOPTIMIZATION SO THAT YOU CAN TEACH C&D?

There's not really space to teach in the C&D.

PIKACHU.EXE: IS IT POSSIBLE TO GIVE A LAYMAN'S EXPLANATION OF AN INTRODUCTION TO QUANTUM FIELD THEORY? IF NOT, WHY DO YOU THINK THE TOPIC IS THAT COMPLICATED AND WHERE WOULD BE A GOOD 'STEPPING STONE' INTO THE TOPIC?

You want to understand fundamental particles and you attack this problem by understanding what happens when particles collide (which you can do in a particle accelerator). Physicists worked out a rather intricate theory that describes this situation. Then you can study this mathematically: what are the structures hidden in this intricate story?

It's complicated to learn because there's a lot of background that goes into it, but I think for most mathematicians, especially those of an algebraic or discrete bent, the biggest problem is that the references expect a physicists' background and a physicists' perspective, so they can be quite hard to make sense of for a typical mathematician. I learned a lot of it by osmosis from my PhD supervisor. There's lots I still don't know.

SANDWICH EXPERT: WHAT IS YOUR FAVOURITE QUANTUM FIELD?

I work particularly with scalar fields, but it's hard not to like the photon.

WALDO@<3.LE-GASP.CA: HOW DO YOU THINK QUANTUM COMPUTING WILL CHANGE YOUR JOB?

Perhaps once quantum computing is old hat, people will stop thinking that I do things related to quantum information just because quantum field theory also has quantum in its name.

CIX: WHAT IS YOUR FAVOURITE 80S POP SONG?

You know what you're asking for here: https://www.youtube.com/watch?v=dQw4w9WgXcQ

ZETHAR: WHAT IS YOUR FAVOURITE ENUMERATION THEOREM/FACT?

The matrix-tree theorem. It is a nice theorem and it underlies a lot of what I do as research.

SANDWICH EXPERT: DO YOU HAVE ANY THEOREMS NAMED AFTER YOU?

No, or at least not yet.

CLARIFIED: WHAT IS THE ONE THING YOU ARE LOOKING FORWARD TO THIS WINTER?

Snow!

TERRIFIED: WHY QUANTUM FIELD THEORY?

Why not?

profTHOUGHTS 141.6

I have only one thought for you: research is more accessible than you think it is. Try an undergrad research term (URA). If the Waterloo math URA program is too competitive for you, or you just want to get out of KW, apply to other universities for a URA. Universities with smaller math programs don't always use up all their NSERC funding for URAs. You don't have to be the cocky top-of-the-class student to do research. Profs can also get funding through co-op to hire a student. This is more flexible than a URA and the work doesn't have to be research, but research is what most profs want to be doing anyway, whether with you or otherwise.

If math research isn't your long term goal, a research term is still a good experience. You get to see what math really is, and then you go out into the world appreciating that. Wouldn't it be great if more politicians and teachers, parents and administrators knew that math was creative and open ended?

Professor Karen Yeats

IMPORTANT ANNOUMENT: WE NEED EDITORS

Did you enjoy the writing in this issue, and wish to help maintain these standards? Do you have an interest in keeping this rag alive and well, at least before we get defunded by the Ontario government? Does the idea of having absolute power over the pizza choices at production night entice you?

Did the following layout mistake, which appeared in v141i5, infuriate you?

And some free advice: the easiest way to start getting back on the train is to restore your proper sleeping schedule.

…

Who am I kidding? I need to study.

Epsilon Screwn and Vesica Piscis

ROLL-PERMU-TATION

We don't care about qualifications — apply to be mathNEWS Editor today!

A mathNEWS EDITOR WHO'S ALREADY DESPERATE TO RETIRE

(PART 1)

If you answered yes to some (or all) of the above questions, then you might be a good fit to be a **mathNEWS** editor! We specifically need editors for the Spring 2020 term and beyond, so if you're interested, please email mathnews@gmail.com and we'll get things sorted out from there.

Looking forward to your bad jokes and silly memes,

*The **mathNEWS** Editorial Team*

MAKE A DIFFERENCE IN THE WORLD: THE NEW COURSE "MATH FOR GOOD AND EVIL"

Do you want to make a difference in the world? Do you ever wonder how your skills and your future work in math could impact people on a broad scale? This winter, the new course "Math for Good and Evil" (PACS 302 Topic 3) explores these questions.

Graduates of the math faculty go on to work in diverse fields, where many ethical dilemmas can arise. Working for a social media or insurance company, you could spot racial bias in an algorithm or policy. An accountant could be asked to hide money in an off-shore account to avoid taxation. A system developer could discover evidence of human rights violations while troubleshooting customer data. Would you understand your professional, legal or moral obligations in such a circumstance? If you found yourself called to be a whistleblower, could you turn to a professional organization for protection?

On a more positive note, mathematics and computer science can be tools for good. Optimization can be used to do more with less, protecting earth's precious resources. Mathematical medicine helps augment the efforts of physicians by determining and recommending the most effective treatments. Game theory and fair division algorithms can help nations to settle disputes peacefully, and to incentivize behavior towards the collective good. This course explores many ways that people use math and computer science to make a positive difference in the world.

This course is designed for students from all faculties and levels of comfort (or discomfort) with mathematics. Students engage with the material through reading, writing and discussion and are not asked to do any computation. We explore the peace implications of topics like policing, social change, health, and environment. Guest speakers have used computer science to study more fair election models, statistics to increase racial diversity in workplaces, and mathematical modelling to reduce poverty and increase high school graduation rates.

An especially strong feature of this course is the chance to discuss issues and collaborate with diverse students from many programs. Co-creator of the course, Peace and Conflict Studies professor Lowell Ewert, "The challenges and problems that the world faces today are far more complex and intertwined than we have seen before. The 'silo' approach to education, in which each discipline independently pursues excellence and assumes that collectively this will add up to a good society, is being tested. Before creating this course, I had no clue how math and peace intersected, but I've quickly learned how instrumental math is to peace. All my teaching has changed as a result of interactions with our math colleagues, as I now see math connections all over the place that I had not recognized before."

The course syllabus is available at https://uwaterloo.ca/scholar/jakoelle.

Judith Koeller
Lecturer in the Centre for Education in Mathematics and Computing

4 EMOTIONS IN 4 LINES CONSISTING OF 4 WORDS.
MODELLED AFTER THE RED WHEELBARROW BY WILLIAM CARLOS WILLIAMS.

DISAPPOINTMENT

> *Waiting in the line*
> *Hands freezing, nose sniffling*
> *Bus on the horizon*
> *Full bus — no service*

ANGER/FRUSTRATION

> *It is due midnight*
> *My hands type code*
> *A screen pops up*
> *5 ran, 4 passed*

DEVASTATION

> *Morning of course selections*
> *Shopping cart already loaded*
> *Woke up before schedule*
> *Quest server shut down*

SATISFACTION

> *It is dark outside*
> *Homework done, closing tabs*
> *A week's worth completed*
> *Eight hours of sleep*

Eggo_Chuggo

ISNT IT WEIRD THAT FERIDUN HAMDALLAHPUR IS AN ANAGRAM FOR GOD

and a superset of allah

not feridun

mathNEWS NEW NEWS

A PSA REGARDING ARTICLE SUBMISSIONS AND FORMATTING

Greetings friends! If you've been following this publication for a while, you'll know that there are several limitations to writing for **mathNEWS**, namely:

- No automatic smart quotes.
- No automatic em dashes.
- No automatic ellipses.
- No LaTeX.

The last issue is a major sore point, considering that we are a publication that prides itself on being, well, math-related. We have received multiple requests over the years to add LaTeX support (most noticeably from dank in v133i4, who wrote an *entire freaking article* full of LaTeX and whatnot, only to have to publish <u>My Hopes for Full LaTeX Support Have Been Crushed</u> instead). Those of you who are familiar with the publication will know that we use InDesign for layout, and being an Adobe product, Indesign naturally does not have LaTeX support (and also makes it a major PITA to insert images).

All of that changes today.

Thanks to the hard work of UW Unprint, **mathNEWS** now supports all of the above (and more) in article content! However, there are a few rules and guidelines to follow by.

DASHES

If it looks like it could be an em dash, we'll substitute it with an em dash. This also means that there may be em dashes in places where there shouldn't be em dashes, and no dashes in places where there should be em dashes. If you want an em dash, you can type either " - " (note the spaces), or its cousins "--" and "---" (and the whitespace-surrounded versions as well) and those will be transformed into a good ol' em dash. An exception is with "--" in numeric ranges (e.g. "0--2" or "0-2") — these will be transformed into an en dash instead (i.e. "0–2"). The converse follows; any uses of "--" and "---" will be converted into em dashes, so if you're trying for a horizontal line do beware. As well, we can't do the conversion if formatting ends halfway through (so "<u> - </u>", "<u>--</u>", and other cases with half of the dash being formatted will not turn into em dashes).

LATEX

We finally support LaTeX! However, it comes with some minor caveats: inline math *must* be delimited with \(\), and display math *must* be delimited with \[\]. Due to the arbitrary nature of many of the articles we receive, we will not transform math delimited with dollar signs. Note that this does not give you legitimacy to submit research papers or write an entire article using LaTeX, because we only support math and that's also really annoying. Regardless, dank, you have been redeemed; we await the fruit of your labour.

IMAGES

When writing on the Wordpress, first upload your image to an external hosting site (e.g. Imgur), then type `Alt–Shift–M` where you want to insert your image. A modal will then pop up allowing you to paste a ***direct*** URL to the image (for Imgur, copy the link to the image [not the album link], paste it into Wordpress, and then add ".jpg" to the end [or your image extension of choice]). Once that works, you'll see a preview pop up, and you can now add the image to your article as you wish.

These changes will take effect beginning the next issue, when we'll be able to harness the script to its full potential. In fact, this issue was partially built with the above script!

This is a really big change for **mathNEWS**, and we're excited to finally be able to announce it. We hope you'll enjoy these newfound capabilities.

The **mathNEWS** *Editors*
Along with UW Unprint, who wrote the actual damn script that lets us do these things now

HOW TO MAKE A PERSON SAY BOO

Option 1: We could always ask for it politely (with puppy eyes). But what if he/she says no firmly and considers you as some degenerate? Human beings have survived 'til now thanks to our wisdom (i.e. by beating around the bush, and playing tricks and mind games). So we get a bunch of other options.

Option 2: Ask "How do you pronounce B-O-O-L?"

Option 3: Do you know how to say no in Mandarin? I can teach you.

Option 4: Stalk someone whose catch phrase contains boo. We can wait until that person solves a math problem.

Option 5: Find someone who is friends with someone that has the nickname Boo.

Option 6: Ask a mathie a question about booleans.

Option 7: Attend a beginner's beat-box class.

Option 8: Write an article and include many "boo"s. Then type up the title: "Read this article out loud — you will never get a better opportunity to exercise your cheek muscles."

Autowired

horror**SCOPES FOR 2020**
I GUESS THIS COLUMN'S A RECURRING THING AGAIN?

Good Lord! Can you fuckin' bah-LEEVE it's almost 2020? Not too often does a freshly-minted decade come rolling out, startling us with its breathtaking, widely-gaping zero in the last digit, the emptiness of the space inside representing the vast myriad of unfilled possibilities in the era to come. Not any sort of geological era begat by some catastrophic extinction event (I hope), but an "era" in the personal sense; a new chapter in the written narrative of our lives, if book metaphors are more your thing. And despite the unknowable uncertainty that shrouds the new decade, my clairvoyant abilities have bestowed upon me the faintest of senses, the feeblest of wisps and whispers of what's to come in the upcoming decade. My dearest reader, most beloved of bitches, I wish to bestow upon you these crumbs of knowledge — simply because of my overflowing generosity, not to toot my own horn or anything. So, read on, for this decade's last installment of horror**SCOPES**.

ActSci: In either 2026 or 2027, you will go on a long overseas trip. It will be quite extravagant and exhilarating — don't get caught up in the whirlwind of excitement, and remember where your roots lie. Your unlucky number: $\sqrt{i}$.

AHS: An unorthodox escape from interpersonal conflicts you may face in the next decade will be to curl up into a compact ball and simply roll away. Your unlucky number: 75, the average diameter in centimetres of the spherical approximation of a human in fetal position.

AMATH: Your opinions on the culinary merit of mushrooms will oscillate rapidly. Your unlucky number: $4.98, the price of a pack of enoki from the Zehrs on Erb.

Arts: Prepare yourself for the revival of 2000s era fashion. It will not be pretty. Things you can do: buy up multiples of your favourite articles of clothing on Boxing Day, start up a cult with your friends where you meet together on Saturdays to burn velour track pants that spell out "JUICY" on the ass in rhinestones. Your unlucky number: 3 inches of rise on your oh-so-baggy jeans.

C&O: Within the first four years of the next decade, you will be the recipient of some very good news regarding your personal finances. Do not take this as an invitation to personally challenge Jeff Bezos at the Kentucky Derby — he has connections that you do not. Your unlucky number: 8, the number of O's after the T in Potoooooooo.

CS: Sometime in the 2020s, you will either: listen to *The Man-Machine* for the first time, or watch the ninth installation in the live-action *Transformers* series ten times in total. Either way, you'll begin to rethink your stance on sex robots. Your unlucky number: 40 projected years before we achieve the Singularity.

Double Degree: The party don't start 'til you walk in. But what if you never walk in? Try your best to avoid knee injuries this decade. Your unlucky number: 2 kneecaps is all you get.

Engineering: You always laughed at those liberal arts majors, knowing you would have great career prospects after you graduate. But in a decade, it's the liberal arts majors that will be laughing after society and technology collapse and philosophy treatises and performance art become the sole currency in the AutoCAD-free wasteland. Your unlucky number: 13.

Environment: You know what they say: patience is a virtue. But you have become tired of waiting. It's time for change. It's time to do something about Eduroam. Your unlucky number: 0.7 Mbps.

FARM: Although you may have no interest in gardening right now, you will become obsessed with it sometime in the next decade. To satiate your passion for gardening despite not having a backyard or a lawn, you take care of a great number of houseplants. Gardening may or may not be a metaphor for having children. Your unlucky number: $550,000 for a 3bed/2bath bungalow in Cambridge.

PMATH: To you, life is but a dream. You're living a dream, but is it your own? Is this dream a nightmare? Do you just not want to wake up because you experience sleep paralysis? These are questions you may want to ask yourself and a therapist in the upcoming decade. Your unlucky number: 3:23 AM.

Science: Whenever you hear a crow caw three times, run. Moreover, invest in some quality orthopedic shoes, it will help with the running (and also bunion prevention). Your unlucky number: 98, your systolic blood pressure reading when you go to the doctor for a check-up.

Stats: You had your moment in the limelight in the 2010s, but all of that is about to change. You can either just deal with it or hire a hitman to kill the spotlight operator in charge. Up to you. Your unlucky number: 6,000 watts.

Undeclared: The year is 2029. A first-year is walking through the hallways of the newly-finished expansion of the SLC. The sound of your footsteps echo quietly behind him. He looks back. There is no one there. Your unlucky number: 9 years of aimlessness.

Finchey

THE PIANO ROOM IN QNC

… Probably nobody's had sex in there.

Anonymous

profQUOTES 141.4

CS 241E: ONDŘEJ LHOTÁK

❝ Let's say I go into job interview mode and ask you how to insert into a linked-list.

❝ I basically gave you an algorithm that says "throw away half your memory."

❝ I should stop making stupid jokes.

❝ The first thing about the exam: don't miss it.

CS 245E: JONATHAN BUSS

❝ That's a software engineering issue, so we'll just blatantly avoid the whole subject.

❝ Sometimes people actually like to use functions.

❝ That's a good point. Give that man 101 in the course!

❝ It will definitely be posted today, where "today" includes 11:59:59.

❝ Instead of making this a pair, let me make this a pair.

❝ I vote in favour of this function.

❝ We've got something named t, we've got something named u, we've made progress.

❝ We've actually made so much progress that we've fallen off a cliff.

❝ Nobody ever pays attention to what gets published in the Princeton Journal of Mathematics.

❝ Gödel's theorem implies chocolate.

CS 246E: BRAD LUSHMAN

❝ I want to remind you of a programming language called Racket.

❝ That is the technical term for it: nightmare.

❝ This [SFINAE] is probably the best made-up word in the entire term.

CS 842: PRABHAKAR RAGDE

❝ There are two hard problems in Computer Science: naming things, and dismantling the patriarchy.

❝ You won't be able to read the proofs though. It'll be as if they were written in... Martian.

MATH 147: KENNETH DAVIDSON

❝ [A student asks whether the exam will have a curve] Yes. There will be a curve sketching problem on the exam.

MATH 235: DAN WOLCZUK

❝ Uh, what am I doing? I don't know.

❝ If there's just one thing you should know from this course, it should be everything.

MATH 235: MUKTO AKASH

❝ Geez, I think I just rubbed chalk on my beard.

❝ Thinking back to MATH 136... Simpler, easier times.

❝ If we saw a complex eigenvalue in 136, we said "ain't nobody fot the time for that," and moved on.

MATH 237: ROBERT GARBARY

❝ [Holding a wooden rod] I am wielding a stick today.

❝ I have no idea how to play with the stick.

❝ [Waving around the wooden rod] I'm afraid I'm going to let go of this and it'll hit someone and I get a lawsuit.

❝ If today has taught me anything, it's that I should integrate the stick more often. It makes me confident, I enjoy playing with it.

❝ I am a hater of numbers that are not 0 and 1.

❝ If you went to the math doctor and said you had these symptoms, the math doctor would tell you to use cylindrical coordinates.

❝ We laughed together and we cried together... Or at least I've laughed and some of you cried.

MATH 249: KEVIN PURBHOO

❝ The exams have a numerical grade, which means nothing.

❝ I have had a lifetime of people mispronouncing my name; I could perhaps think of this [handing back papers] as my revenge upon the world.

❝ Anyone by that name? Anyone approximately by that name?

❝ Crap; why did I do this?

❝ I will give you the definition just to prove that I can.

❝ I can take my shrinking ray and zap these five edges…

❝ Want to see it in slow motion? [draws the graph two more times]

❝ I've done this example maybe twelve times and this is maybe the first time I've done it correctly.

❝ 1 vertex, 6 colours. This is **beyond trivial**.

❝ It turns out that the 6-colour theorem is actually useful.

❝ If you sit in the front row every time, I know if you miss class.

❝ It was conjectured in 1852, before most of you were born.

❝ I have a mission for you guys. I need a team of people to find me some whiteboard erasers.

❝ In my department, we're not cool enough to have purple markers.

❝ This is also a marriage in the sense of Homer Simpson.

❝ You probably don't want to use this algorithm to set up your marriages.

❝ I'll think of something to say about the final.

❝ I said I would say some words about the final, and most of those words are on the website.

❝ Let me say this in another, more fun-looking way.

❝ I apologize. It's mostly not my fault.

PMATH 351: KENNETH DAVIDSON

❝ This example is cooked up to be bad.

❝ So what happens when x is equal to 0? Well, nothing good because of that stupid x to the fourth power in the denominator…

❝ This symbol is used to denote 'smaller under norm'. Nobody else uses this notation because I invented it. I think people should start using it because it is a great invention… anyway sometimes this appears in my notes but you won't see it in books.

STAT 230: GREGORY RICE

❝ If you're a hipster mathematician, you might celebrate tau day.

STAT 330: REZA RAMEZAN

❝ How do you spell innocent… I have never been innocent so I don't know how to spell it.

MATH MAJORS AS CND DRINKS

Act Sci — Large French Vanilla, $1.50

Applied Math — Medium Cappuccino, $1.25

C&O — Large Coffee, $1.35

CFM — Snapple Iced Tea, $1.85

Computational Math — Fairlee Iced Tea, $1.25

CS — Arizona Can, $1.25

CS/BBA — Double Cupped Large Tea with Extra Tea Bag, $1.25

Data Science — Nestea Green Tea, $1.85

FARM — Medium French Vanilla, $1.25

Math/BBA — Large Tea with Extra Tea Bag, $1.00

Math/Business — Small Tea, $0.75

Math/CPA — French Vanilla in Travel Mug, $1.00

Math Finance — Medium Half and Half, $1.16

Math Physics — Small Cappuccino, $1.00

Mathematical Studies — 237mL Chocolate Milk, $0.90

Math/Teaching — Medium Coffee, $1.05

Pure Math — Coffee in Travel Mug, $0.85

Software Engineering — Soy Sauce Packet, $0.05

Statistics — vitaminwater (mega c), $2.50

Undeclared — Nestle Bottled Water, $0.80

Change is $0.15

You should be concerned if I were to stop biking to the university.

PROF. BENOIT CHARBONNEAU

👏👏 FLAG REVIEW 4: THE FOURTH FLAG REVIEW

FLAG REVIEW 👏👏

Last **mathNEWS** production night, I asked the people working on **mathNEWS** which flags I should review this time around. I got a lot of suggestions, some of which were…controversial, some of which were too cliché, some of which were very meme-y, and a very rare few which were actually good suggestions. Thus, this time I will be reviewing some municipal flags of Canada.

Here is my rubric, like always:

The flags will be scored out of 10, with 5 of those being my holistic subjective score, and the other 5 being based on each of the 5 basic principles of flag design as defined by the North American Vexillological Association (NAVA). They are:

- Keep it simple
- Use meaningful symbolism
- Use two or three basic colours
- No lettering or seals
- Be distinctive or be related

FLAG OF TORONTO

The City of Toronto flag does what it needs to do in a very simple yet distinct way. For those that do not know what the Toronto City Hall buildings look like, it consists of two tall curved buildings on either side of a circular Council Chamber building. The white coloured portion of the flag encapsulates that iconic image, and adds a new meaning to it: The horizontal curved portion added to the shape of the two vertical lines makes it appear like the letter T, meaning Toronto. It is a great design choice to make. The only fault I see with the design of this flag is the maple leaf at the base of the T. This flag does very well in its municipal symbolism and design, but the addition of the maple leaf appears out of place. It is a national symbol, and not a municipal one. It is
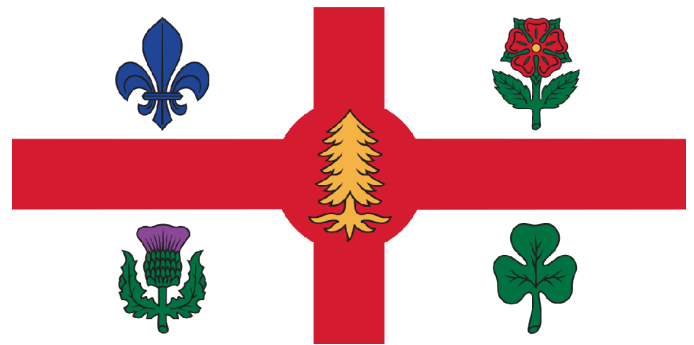
not distinctive nor representative of Toronto specifically. If the maple leaf must be included in the flag to symbolize a national connection of sorts, it would have been better suited to have been placed centrally on the flag rather than at the base of the T. The flag without the maple leaf would have still perfectly suited the City of Toronto, with its simple design, but even with the maple leaf, it still makes a great flag.

Design Score: ★★★★☆

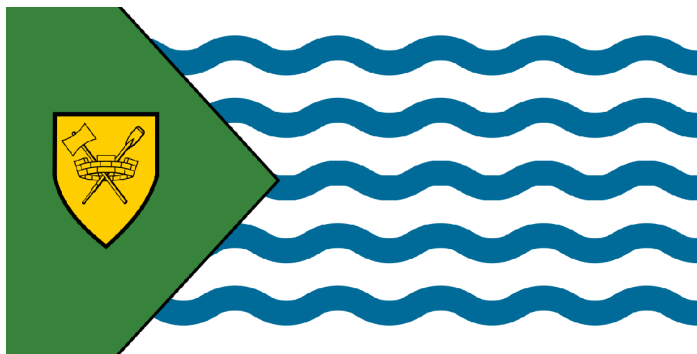Subjective Score: ★★★★☆

FLAG OF MONTREAL

The flag of Montreal shows right away what its connections are. The English and French origins are clearly seen from the flag. It uses a variant of the St. George's Cross seen on the flag of England, only with a circular portion in the centre, on a design similar to the flag of Quebec with its fleurs-de-lis. Although, instead of purely just fleurs-de-lis, this instead uses British and Irish symbols as well. We'll get to the central symbol after. Starting in the first quadrant going clockwise, we see the Red Rose of Lancaster (not the Tudor Rose) representing the English, the Shamrock representing the Irish, the Thistle representing the Scottish, and the Fleur-de-lis representing the French. Despite being in Québec, considering that there were no distinct French symbols before 1939, I guess it is worth mentioning that ⅕ of the symbols being French (previously ¼ of the symbols) is better than none. The fifth and final symbol is the white pine, added to the flag in 2017, representing the First Nations Indigenous peoples. Considering their continuous presence in what is now Canada for thousands of years before colonialism, it is great to see their representation on a municipal flag. You don't really see much representation in other municipal flags. It is a welcome sign that Montreal added theirs without ruining or overcomplicating the design of the flag. Let's hope they don't need to add a sixth symbol anytime soon. Any more and the flag will become too cluttered with symbols everywhere. Overall, it is a great flag, deep in symbolism and historical connection, which perfectly suits the city of Montreal and its inhabitants.

Design Score: ★★★☆☆

Subjective Score: ★★★★☆

FLAG OF VANCOUVER

The general shape of the flag of Vancouver is quite similar to what a lot of flags tend to look like; there is a triangular shape on the left with some design on the remaining portion of the flag. Some flags, like South Africa's, use the design very well. Some, like this one here, don't do it as well. Starting with the better portion of the flag, we see the blue wavy lines across a field of white. Vancouver being a port city, surrounded on three sides by water, just tucked away from the Pacific Ocean by the Salish Sea, it is clear that the blue waves symbolise the city's connection to them, and justifiably so. You don't really get to see any wavy bars across flags often. It makes this flag stand out. On the hoist side of the flag, the green pentagon represents the forests which used to cover the city. Vancouver is quite known as a Green City so it still fits in well even if most of the forests are now gone. Finally we get to the last element on the flag: the yellow badge. I've said it before; such fine detail is not visible from a far distance, and it makes the flag unnecessarily more complicated than it needs to be. Instead, Vancouver should do what is seen on the flag of Toronto. Perhaps the triangular part of the green pentagon should have a yellow border on it. This would make the flag have a sideways letter V for Vancouver on the flag. This is definitely a missed opportunity. Toronto can't be the only big city to have its own initials on its flag. It's unfortunate that the city chose to put their city badge on the flag instead.

Design Score: ★★★☆☆

Subjective Score: ★★★☆☆

BONUS FLAG: FLAG OF WATERLOO

I have never seen Waterloo's flag, but the City of Waterloo website says that the "crest … comprises Waterloo's official flag." I take this to mean that Waterloo's flag is the crest on a white background. Considering the city motto is "Stability" the flag sends the wrong message as it looks more chaotic than stable. Who decided this was a good idea? Can we please get City Council to seriously think and contemplate the grave error of their ways? This needs to be fixed. Even Cambridge's flag looks better than Waterloo's, and have you seen the flag of Cambridge? I guess I should start with the colours. I don't even know if using only two colours, or not using any other colours at all is a better choice. The pure block of black details on yellow is just hard to look at. So, in this case, keeping it limited to two colours did not help at all. Would anyone even be able to discern or tell apart all the details when the flag is hoisted? Obviously not. The detailed designs of a city's seal is meant to be seen on papers and documents, not on a flag. Furthermore, the fact that it needs to say "City of Waterloo Ontario" defeats the purpose of a flag, which is representing without the need to write out what it is that it's representing! Until Waterloo gets a better flag, it's best not to use this flag at all. F.

Design Score: ☆☆☆☆☆

Subjective Score: ☆☆☆☆☆

As always, you're free to submit flags to the **mathNEWS** email if you wish to see them reviewed. Make your own flag and submit it if you want to. You have plenty of time to do so, since the next issue isn't until the beginning of the next term.

boldblazer

THE 42ND BATTLE OF WATERLOO

This article is about the 2019 battle. For those looking for the previous 41 battles of Waterloo and any future nonsense this university does, see Battle of Waterloo (disambiguation).

The **42nd Battle of Waterloo** was a decisive campaign in the MathSoc-EngSoc War of 2019 that took place between November 8-24 at the University of Waterloo. EngSoc seized MathSoc's Natural Log, but in haste left clues for MathSoc to locate the Natural Log.

MathSoc's Non-Cowardly Action Committee (NCAC), acting on this information, engaged and routed NEAC and was able to seize and return the Natural Log back to Fort Stanton. This inflicted devastating damage on the EngSoc morale that proved irreparable, with some MathSoc personnel at the campaign calling it "the most stunning and decisive blow in the history of university feuds."

EngSoc, like with the previous attacks on the Pink Tie, sought to eliminate MathSoc's influence on the University and become the dominant society. EngSoc hoped that their victorious seizure and essential annihilation of the Pink Tie would demoralize MathSoc into submission. However, MathSoc became more united under another Pink Tie. Seeing effects opposite to their intentions, EngSoc planned to inflict another disastrous defeat to MathSoc to cripple MathSoc's ability to threaten EngSoc again. The Natural Log, a symbol of MathSoc's unity, much like the Pink Tie, was EngSoc's target. Removing it, EngSoc hoped, would achieve their goals towards society domination.

MathSoc was aware of EngSoc's plan after the Log Theft, however, due to EngSoc's leaflets all around campus indicating their regrouping at the Rock Garden. Subsequently, MathSoc sought out to ambush the EngSoc armies and obtain intel about the Log's whereabouts. In the subsequent clash at Rock Garden, MathSoc found the new location of the Log and succeeded not only in retrieving the Log but also seizing EngSoc's prized rigid tool.

PRELUDE

On Nov. 8th, several EngSoc students infiltrated Fort Stanton, where they found the Log poorly guarded. Seizing the opportunity, they took out the Log and put up a meme mocking MathSoc's inability to defend the Log in order to damage MathSoc's ego. The Log stealing went unnoticed until Nov. 9th, buying EngSoc a day of time to properly hide and figure out what to do with the Log. MathSoc's inability to respond to the stealing for a day may have almost cost them the Log.

On Nov. 9th, the Math faculty found out about the Log theft. MathSoc students were outraged that such a theft of one of their most prized mascots could happen in a secure place, and many demanded revenge. In response, the Supreme Mother Function, MathSoc's governing body, officially declared war, and began organizing a W.A.R. committee. The process would take a lot of time, however, as many other math students were either not interested or were plagued by an energy-draining virus known as CS 246. Their efforts were further hindered when EngSoc infiltrated Stanton again in the infamous 'Comfy Raid,' damaging MC Comfy with purple balloons and tape, which lowered morale even further.

By the 23rd, however, MathSoc was able to organize two small divisions of 30 students, eager for revenge. They organized the corps into a committee known as the Non-Cowardly Action Committee (NCAC). Simultaneously, EngSoc, expecting a response in about two weeks due to their spy reports, began sieging Fort Stanton to prevent the newly formed NCAC from gaining the initiative. Their divisions, known as NEAC, would outnumber NCAC 2-to-1.

BATTLE

BREAKOUT AT FORT STANTON

The main logistical problem with the NEAC divisions was that there were too few people surrounding a large perimeter. The NCAC, acting on the relatively low density of the enemy forces, began rapidly probing in and out of the four entrances of Fort Stanton. The NEAC, needing to contain the enemy at Fort Stanton, had to waste valuable energy moving back and forth between the entrances due to their lack of personnel.

On Nov. 24th, at 11:14 AM, a two-sided probe outwards of Fort Stanton by the NCAC (with NCAC Div. 1 probing out of the northwest entrance and NCAC Div. 2 probing out of the southeast) ripped the NEAC divisions into two. At this point, NCAC could either force one of the two NEAC divisions out of the war by overwhelming it with both divisions, or attempt a breakout at the north escape route into Rock Garden created in enemy lines. In what was known as the '20 second dilemma', the NCAC commanders quickly and definitely not through rolling a d20 decided on the latter action, having both divisions breakout into Rock Garden. The breakout was successful and both divisions escaped the siege at 11:18 AM.

In fact, this course of action was exactly what the NEAC had hoped. They only sieged Stanton with half their forces; the other half was kept waiting in the Rock Garden, and the Stanton Siege divisions were notified to intentionally open up the entrance towards Rock Garden for this exact purpose. As NCAC Div. 1 and 2 came out of Rock Garden, the hidden ambushers struck.

ROCK GARDEN BATTLE

By 11:20 AM, it was obvious to the NCAC commanders that it was a trap. Having no other course of action and being rapidly bombarded with purple balloons and leaflets stating '0=1,' the NCAC commanders tried the only card available to them. They ordered the divisions to lie down in a way such that '$\pi = 3.14...$' could be read from a distance. This maneuver shocked NEAC students who were "visibly trembling." Seizing the initiative

and their enemy's visible weakness, at 11:26 AM they began yelling math facts and memes that contradicted NEAC views. An NCAC student later recounted that "the enemy lines were quickly falling apart and it was unclear what they would do."

As the NCAC began to slowly gain ground in the Rock Garden, they came across an abandoned NEAC parcel. In it, the NCAC found leaflets that the NEAC planned on putting up on MathSoc buildings which indicated the Log's location in order to deal a decisive morale blow to MathSoc. Learning this, the NCAC sent a small division back into Fort Stanton, exiting the other way and flanking into the Log's new location, while the divisions that stayed behind would pin all of the existing NEAC divisions. To do this, they selected about 15 students from Div. 1 and Div. 2 and formed Div. 3, and sent them to CPH, the Log's new location. NCAC Div. 1, Div. 2 and most of the NEAC would remain at Rock Garden for the rest of the 42nd Battle of Waterloo.

CPH BLITZ

Div. 3 had no issues reaching CPH as none of the NEAC forces noticed nor attempted to rout them, yet they exercised evasive maneuvers just in case. By 11:57 AM, they reached the perimeter of CPH. Before entering, they decided to vandalize the EngSoc statue there with the value of pi, the pink tie, etc., which is still visible today.

Upon entering CPH, they realized that EngSoc's critical weakness was that they too were horrible at guarding things. Which is weird, because they are engineers, so they should be able to design decent defense mechanisms. The Log was unguarded, and it was next to the rigid tool, EngSoc's mascot. EngSoc had planned to take a photo of them together to show EngSoc's domination over MathSoc. Noticing that they can take the tool with the Log, Div. 3 had no hesitation in doing so. After returning the Log and the tool back to the Log's location in Fort Stanton, they notified Div. 1 and Div. 2 at about 12:41 PM, and the battle was essentially over.

AFTERMATH

EngSoc became more resentful of MathSoc, as they had the intel and numerical advantage over their enemy, yet not only failed to deal a morale blow to MathSoc but also ended up losing their mascot to MathSoc. MathSoc, on the other hand, paraded their victory by placing the Log and tool visibly in public to deal morale damage to EngSoc. They have since put the Log and the tool in a hidden, guarded location and vowed to not let this happen as easily as before.

This battle allowed for the rise of MathSoc as the main society of University of Waterloo, which as of this point of writing is now the largest Society on Campus, and the slow fade of EngSoc back into 2nd place. There is no armistice signed, however, so EngSoc and MathSoc are still at war, and tensions remain high between the two societies. Some students on both sides, however, agree that the war is essentially over as no further action has been taken from either society since the 42nd Battle of Waterloo.

Casualties of the 42nd Battle of Waterloo are:

NCAC: minimal

NEAC: decisive ego blow and the loss of the rigid tool

Saratoga

N PREDICTIONS FOR THE 2019 BRITISH GENERAL ELECTION

- The Brexit Party's plan of only targeting Labour-held seats backfires magnificently.
- The Conservative Party wins a small majority, but enough rebel MPs will cause Brexit deadlock that the election was supposed to solve.
- The SNP will dominate Scotland again. They make another referendum part of the Brexit deadlock.
- The Monster Raving Loony Party makes massive gains (relatively).
- Jeremy Corbyn somehow manages to exceed expectations like the last time.
- A Scottish constituency is won by less than 10 votes. The parties of the losing candidates all blame each other for vote splitting.
- Attempts to prevent vote-splitting among the Remainer parties fail to make an impact. The Liberal Democrats don't make gains.
- After the Conservative Party's "lo fi boriswave beats to relax/get brexit done to" video, the other parties release their own versions.
- Lord Buckethead makes an appearance at the announcement of the result of the vote in Boris Johnson's riding of Uxbridge and South Ruislip.
- A different pork product will become involved in a scandal.
- As for Northern Ireland: no one can predict Northern Irish seats. It's a clusterfuck of parties splitting the vote for the most part. Have you seen some past results? MPs have won seats in Northern Ireland with like 25% of the vote.

boldblazer

WE GOT OUR NATURAL LOG BACK!!!!!!

YOU LOSE ENGINEERS!!!!!

Narf Dert

EXCLUSIVE: INTERVIEW WITH THE HERO WHO LIBERATED THE LOG

mathNEWS secured an exclusive interview with MathCom, the hero who liberated the Log.

HOW DID THIS WAR START?

mathCOM: This war is one in a series that was ignited when an innocent MathSoc executive delivered a gift to the N-jineering Society of 35 tubs of cool whip.

WHY DID THIS UPSET THE n-JINEERS?

mathCOM: Your guess is as good as mine. They are strange people. My understanding is they had some fun with it. They put it in their beards and hair, had some fun with it, then turned around and retaliated.

HOW DID THE n-JINEERS RETALIATE?

mathCOM: They stole the sacred Natural Log of MathSoc right out of its glass home, and sent us a terrible, terrible email detailed the theft directly from the president's office of the N-jineering Society.

WHAT DID MATHSOC DO TO DEFEND THE HONOUR OF MATHIES?

mathCOM: The immediate reaction was to steal a plaque/poster from POETS that was a commemoration of when n-jineering stole the pink tie during Orientation week of 1992. They've got it put into a picture with this giant plaque and everything, and they've got it screwed into POETS as a mockery of math students everywhere. It was then a would-be-member of the NCAC walked into POETS during daylight hours in a clever construction worker disguise, screwed it off the wall, and walked out.

WAS A CLIPBOARD PART OF THE DISGUISE?

mathCOM: Yes.

DID THE n-JINEERS DO ANYTHING TO RESPOND TO THIS?

mathCOM: I don't think they noticed until we sent them an email.

Our dear, dear president sent them a photo of the theft along with a declaration of war to the n-jineering society, and that is when they found out about that.

No direct retaliation followed that.

SO WHAT HAPPENED NEXT?

mathCOM: The brave members of the NCAC decided that stealing this plaque was not retribution enough for the theft of the Natural Log and further steps had to be take to intimidate the N-jineering Society.

Then on a cool Friday night the NCAC bravely broke into POETS and put up 300 "lost, have you seen this Log?" signs, as well as redecorated the famed n-jineering statue.

WHAT DOES NCAC STAND FOR, AND HOW IS IT RELATED TO THE W.A.R. COMMITTEE?

mathCOM: The NCAC is the Non-Cowardly Action Committee.

A committee that stands proud rather than hiding behind non-existence like the terrible Non-Existent Action Committee.

The W.A.R. committee is a facetious front whose existence allowed the NCAC to operate in the background without being noticed.

WHAT DOES W.A.R. STAND FOR?

mathCOM: The W, A, and R, each respectively stand for W, A, and R.

HOW WAS THE LOG RESCUED?

mathCOM: The Log was rescued by the brave members of the NCAC with a great deal of self-sacrifice and courage.

On an even cooler Sunday night, the n-jineers made an attempt to pull a prank on the Mathematics Society, but in the process they exposed the whereabouts of the Log, which allowed the NCAC to track it down, rescue the Log, as well as an itty-baby little tool.

HOW MANY TOOLS IS N-JSOC IN POSSESSION OF, BESIDES THE LARGE TOOL?

mathCOM: Besides the rigid tool, they have the mini rigid tool, which is also chrome-dipped and chained to the speaker

at meetings, and they seem to acquire non-chrome dipped mini rigid tools as they have the need for them.

I am unsure how many are in their possession.

I recommend MathSoc also build up our arsenal to match.

WHAT DOES THE NCAC AND MATHSOC PLAN TO DO WITH THE NEWLY ACQUIRED TOOL?

mathCOM: Well, and I really do find this humiliating on the N-jineering Society's part, but they misspelled "rigid" on the tool.

So we do plan to correct that spelling "ridgid" to "rigid" as well as give it a new look with a little bit of MathSoc flair.

Then it will remain in its home in MC forever, with its best friend the Log.

WHAT WILL MATHSOC DO TO SECURE THE LOG FROM NOW ON?

mathCOM: The Log has been kept thus far in very safe storage, hidden away.

But that's not any fair to the Log, so now MathSoc is seeking to pass new by-laws making the protection of the Log one of the primary directives of its President.

IS THERE ANYTHING ELSE YOU'D LIKE TO SAY TO MATHIES ON THE BEHALF OF THE NCAC?

mathCOM: The NCAC expresses its deepest condolences for those that had to experience the hardship of using MC Comfy after N-jSoc's terribly executed MC Comfy attack. It was nothing short of embarrassing, once again, on their part.

Senior War Correspondent

WRITING FOR LEISURE?!??!?!?

I have forgotten the relaxation in writing for leisure. There are no expectations nor pressures to write perfectly. There are no guidelines restricting what you can and cannot write. Whatever words that come to your mind is what you put down. It is a special type of serenity — a serenity in creating on a tangent of a thought. Your canvas is unlimited, free of boundaries like a word count or style of writing — just type in the words that come to your stream of consciousness.

The lack of marking rubric lends itself to artistic liberty. Your own choice of expression without binding responsibilities. A clean slate of whatever you want, however you want.

Eggo_Chuggo

TRYING TO SLEEP 4 JUILL. 2018 À 03 H 17

I hate waking up I hate lying idle in the dark with morning only seconds away watching the digits turn. I hate playing dead I hate the silence waiting for tomorrow when it already is. I hate the coil whining and the TV mumbling, no substitute for life. aliveness.

cy

N math**NEWS** B-MOVIES

- L'Hôpital's Rule… From Outer Space!
- Teenagers From MATH 145
- The Night of Lebesgue
- Math Samurai
- I Was a Teenage Cosine

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N WAYS TO GET BACK AT THE ENGINEERS FOR STEALING OUR LOG

- Painting all of E5 and E7 Pink
- Entice them with PROPER pie, and then get them while they shitpost
- Have the Iron Warrior website redirect to math**NEWS**
- Move the Iron Warrior HQ to Imprint's storage closet
- Having all the Engineering first-years move out of UWP into CLV
- Reuniting the faculty by moving all of Engineering's classes to be with the Architecture students in Cambridge
- Stamping all their posters with the Log stamp
- We transfer funding for building E9 into building M5

Narf Dert

WORDS/PHRASES I LIKE TO USE TO FLEX ON HATERS

Preface
Cacophony
Eulogy
Ostracize
Persnickety
Effervescent
Subjubilate
Ad Hoc
Status Quo
Contraceptagon
Quod Erat Demonstrandum
Quadratory
Imaginize
Kafkaesque
Basilica
Creponurate
Evangelize
Grendrate
Skintle
Porchsk
Neon Genesis Evangelion
Penultimate
Unvulvatiable
Catharsis

Gerrymandatory
Subliminpolize
Aubration
Unblaut
Ok boomer.

Decorum
Mennoniscopy
Tarpse
Quorse
Marriage A-la-Mode
Blutz
eSwatini
Magyar
Austrialia
Kyrgygzstan
Phitlacturation
Filibuster
I am closely related to Jim Quizbowl.
I am ESL.

Eggo_Chuggo and RubberSoul
Aptly known as the powerhouse that is,
RubberChuggo

PROFESSOR JAO CAUGHT WATCHING ANIME IN MC 5032

On December second, 2019, tragedy struck the University of Waterloo as beloved professor David Jao was seen committing a shameful act, an act which has no place in society (and we do live in one). David Jao was seen watching anime.

An anonymous student claims to have passed by the room during a late-night stroll through MC, when he heard the faint—but unmistakeable—sound of an edgy anime protagonist shouting in Japanese. Horrified, the student peeked into Jao's office, whose door was slightly ajar. The lights were turned off, but professor Jao's unmistakeable countenance was illuminated by the pale glow from his computer monitor. Horrified, the unnamed student eased the door open and stepped into the room, hoping against hope that it wasn't what it looked like.

But the writing was on the wall: Professor Jao's screen was lit up with brightly coloured Japanese animation. Images of tsunderes, yanderes, danderes, shounens, and chunibyos filled Jao's eyes, while words like "ohayo!", "arigato!", and "yoroshiku!" blared unacceptably loudly from his headphones. The unnamed student allowed a sharp gasp to escape his lips, alerting Jao to the fact that he had been caught red-handed.

The startled professor abruptly turned around; when he saw the silhouette in his doorway, he gave a hiss of fear and rage. The student ran for his life, and Professor Jao escaped into the night.

It is well-known among the denizens of the university that Professor Jao has historically had problems with anime addiction. In fact, in his younger days the wayward youth even translated anime into English, possibly exposing other young people to the disease.

For years, it seems, he successfully kept his secret from everyone: his students, his colleagues, even his family. But once a junkie, always a junkie, it seems.

Professor Jao's whereabouts are still unknown. And David, if you're reading this, please seek help. We're all worried about you.

eeeeeeeee

13 doesn't exist.

ROB HACKMAN

THE JOYS OF COMMUNICATION (GAMES)

Language is a beautiful thing, an elegant system used to efficiently and effectively transmit ideas. At least in theory. In practice, having people understand the thing you mean is rarely easy. This can oftentimes lead to stressful misunderstandings, and that's never fun when it's happening to you. It does however make for some great stories.

This is where communication games come in. They take the murky bog of transmitting ideas, and turn it into a comedy of errors. There are many games in this category; however, my two favourites by far are Codenames and Decrypto.

Codenames is a game where you find one word that associates with as many of your own words and none of other people's words. This desire to maximize association can lead to some tenuous leaps for judgement, like my teammate determining that the most logical obvious word to associate with lake was sword, or this same teammate thinking that associating the Simpsons with sun and stamps was perfectly sensible as there exist commemorative Simpson Stamps and Homer works at Power Plant, and the sun is a power plant. I promptly banned my friend from making pop culture references. I actually think we did quite well after that.

The other game we played is Decrypto, which while similar to Codanames is kind of the opposite. In Codenames, you want to come up with the best clue for a bunch of words, whereas in Decrypto, you want to come up with the worst clue you can give for a word that will still lead to someone guessing the right word.

I had a turn where I made references to a card game from the medieval ages, an obscure web novel, and something I thought was common knowledge. The obscure trivia was very successful, but apparently no one is familiar with the term "Domino Mask".

I guess the moral of my story is when playing these sorts of games, never assume something is obvious, because the answer to the question "are you pondering what I'm pondering?" is almost always no.

Beyond Meta

KNOCK KNOCK

```
10 Knock knock.
20 Who's there?
30 Banana.
40 Banana who?
50 GOTO 10
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eeeeeeeee

A POEM

fnjkfsad; nfeksl f[msadl;f''

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gdal;x 'gdalkg;

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SFDA ISADF BOhdfsji ogbhjdigorheistpg guiorsdgfhjk

eeeeeeeee

ℤ THINGS I HATE ABOUT MATH 145

- Zermelo Fraenkel set theory (with or without the Axiom of Choice)
- Zorn's Lemma (Lemon, Lemming, etc)
- $\mathbb{Z}$, or any other ring with the integers, ($\mathbb{Z}[x]$, $\mathbb{Z}[i]$, $\mathbb{Q}(i)$, $\mathbb{Z}/n\mathbb{Z}$, $\mathbb{Z}_p$, etc)
- $z \in \mathbb{C}$

In all seriousness, I'm writing this article in hopes that Blake Madill sees it so I can tell him that Math 145 was one of my hardest and most rewarding course I've taken this term. Working on the assignments helped me meet new friends and learn a lot of new things. His food recommendations, although not good for the body, are great for the soul and there should be hopefully an article in here about that too. All in all, although there are $\mathbb{Z}$ things I hate about 145, there are $\mathbb{R}$ things I Ioved about it.

Depressed Cubic

(P.S please be generous with the curve)

N REASONS WHY YOU SHOULD DO ORIENTATION

- Make an impact on incoming students
- Free food that's not pizza!
- A pink tie, a shirt, a water bottle and possibly a bandanna — all yours for the unbeatable price of $0!
- Have an excuse to boss people around for an entire week
- Make a lot of friends (and when I mean a lot of friends, I mean *a lot* of friends)
- Chant "ME-SA YOU-SA WE ALL SCREAM FOR WUSA" at the WUSA execs
- Protect the giant pink tie from those pesky engineers
- Carry a radio around with you all week
- Meet EDCOM (and make them laugh!)
- Become a living meme among the first-year students
- Shake Feridun's hand
- It's more fun as a leader than it is as a first year
- Design logos that will be worn on 1000+ shirts
- Drive a pickup truck
- Create a Math Dance that will go down in history!
- Take control of the Math Orientation Instagram!
- A list? What list? I've never heard of it.

Want to do any of these things? Sign up to be a Math Orientation Director (MOD), Head Pink Tie (HPT) or Pink Tie!

You can sign up at http://tinyurl.com/uw-mod-2020 for MOD and HPT! And for Pink Tie — applications open December 11th!

Questions? Email mathorientation@uwaterloo.ca

honk

GOOD AFTERNOON

Please remove your earbuds and headphones.

Food and drink are not allowed during the examination period, with the exception of water in a clear plastic bottle with no label. If your bottle has a label, please remove it now. If you are wearing a hoodie, the hood may not be worn during the exam period. If you require a brief nutrition break, please raise your hand and a proctor will accompany you into the hallway.

Turn off any electronic devices and place them in your bag. Cell phones may not be kept in your pocket for the duration of the exam. Only pens, pencils, erasers and special materials are permitted on your desk. Any unauthorized materials must be securely stored and inaccessible for the duration of the exam

period. Bags must be placed underneath the tables and not blocking the aisles.

Place your WATCARD on your desk and complete the examination candidate card. If you do not have a candidate card, a grid sheet may be circulated for you to sign.

The length of the exam is two and one half hours. No one may leave during the first hour of the exam. If you finish early, please leave quietly to avoid disturbing others.

Good luck on your exam. You may begin.

The PAC proctors

CALCULOVE 137

WEDNESDAY 4TH 2019

I have never believed in love at first sight — it always seemed like a silly idea. Seeing someone and instantly knowing that you are meant to be together? Today was the day that all changed. I walk into my first MATH 137 lecture, and there he is. Standing there at the front of the lecture hall, with his slicked back hair, white undershirt, dark short sleeved button up, and kind smirk. I just know instantly that this is the man of my dreams.

FRIDAY NOVEMBER 15TH 2019

I take my earbuds out, pausing my podcast as I prepare to walk on that hallowed ground.

My heart skips a beat as I approach the door — fluttering — anticipating the lecture to come. I am about to be blessed by the only man who can warm the cold of that one vent in MC2065. My hand pushes against the wood of the door. As I turn to see if anyone is behind me, my eyes meet his gaze. My pulse reaches a local maximum as I hold the door open for the love of my life. He nods, walks through the door, and says the words that have echoed in my head ever since that glorious day.

"Thank you very much"

FRIDAY NOVEMBER 27TH 2019

He always said bless you.

The end of the semester was drawing near and I had yet to sneeze during his lecture. Unacceptable. I needed his blessing, and I would do whatever it would take to get it. So, I began my research, reading article upon article of how to make yourself sneeze; and the solution I reached was pepper. The day of the final lecture had come and I was ready to put my plan into action, today was the day that my ears would be blessed by the soothing voice and kind words of the man of my dreams. I begin the execution of my plan by filling up an empty gum

wrapper with black pepper from my cafe. I then, slip the pepper in my pocket and walk to his lecture with a skip in my step, anticipating the events to come. Then about halfway through one of his impeccable lectures, I casually take out the wrapper of pepper, pour it on my notes, and push it into a line. Now, for the final step of my plan I lean forward, put my nose to my paper and take one good sniff. The plan is complete, and I am ready to sneeze and be blessed by the most beautiful human being on the face of this earth…

But the sneeze just doesn't come, instead my eyes begin to water, my nose starts to burn, and I realize I just snorted black pepper for nothing.

DECEMBER 2ND 2019

I sit in **mathNEWS** production night, reminiscing about the semester, and all the wondrous moments we had. Every lecture, every quiz, all those Fun Fridays, the spooky stories at Halloween, him telling us his favourite joke (pass the fucking potatoes), and everything in between. It's been one hell of a ride, and I've loved every moment. To paraphrase your words at the end of every Wednesday lecture: Jordan Robert Hamilton I wish you the best of luck, but more importantly, have a great day.

With love,

Your not so secret admirer(s)? <3

PSA: MC 1006 IS NOT YOUR EXAM ROOM, YOU WANT TO GO TO M3 1006

That poor person in that tiny office cannot catch a break with confused exam go-ers. LEAVE THEM ALONE DAMMIT….

Narf Dert

MATH ORIENTATION 2020 SEZ

Math Orientation Director and Head Pink Tie application are open till January 8th! Scan the QR code on the right to apply or go to LEADs! Front line leader applications will be out December 11!

Eli, Josué, Kanan, Thomas
Math O-Team 2020 (Previously known as Math FOC)

NEW FOOD NETWORK SHOW JUST THROWING BRICKS AT PEOPLE WHO ARE TRYING TO COOK

NEW YORK CITY — Following the success of shows like *Cutthroat Kitchen* and *Chopped*, the Food Network has introduced a new show for its summer lineup. In it, four chefs will will compete to cook various dishes while the audience throws bricks at them. If a contestant is hit by a brick and dies, or if they fail to impress the judges, they will be eliminated, or bricked, as the show calls it.

Food Network Head of Programming, Guy Fieri, was optimistic about the new show, saying, "Ever since the success of *Chopped*, where people have to cook while being limited by their ingredients, and *Cutthroat Kitchen*, where people have to cook while being limited by their tools, we've seen the future of food programming. I hope with our new show, *Brick Kitchen*, that we have distilled the experience down to its purest form, where contestants must deal with their limits of their very human, brick-susceptible bodies."

Food Network has also announced ground-breaking social media integration for its new show. A new machine provided by Kitchenaid will automatically throw a brick at any contestant if it receives a tweet with the contestant's name and the hashtag *#brickkitchen*.

The winning contestant receives $10,000 and an optional protocol for concussion treatment.

UW Unprint

GET READY FOR STARTERHACKS 2020!

Canada's largest beginner-focused hackathon hosted at the University of Waterloo. They're hosting their 4th annual event on January 18-19th, 2020. They're one of the largest tech events in Canada, inviting over 1000 students to come, learn, and collaborate. It's the best place for people with zero "hacking" experience to learn how to code, design, and pitch a business idea.

Hop on over to the StarterHacks website at `www.starter-hacks.ca` and apply today.

They're welcoming all aspiring hackers, business people, developers, designers, and more to join the tech movement!

StarterHacks

N THINGS I NEED TO DO DURING THE EXAM PERIOD

- Try not to procrastinate
- Catch up on all the reading I didn't do during Reading Week
- Triple check my exam itinerary so I know EXACTLY when and where my exam is/exams are
- Get a Pink-Tie approved calculator (probably at MathSoc because they sell them for cheap)
- Get some sleep
- Try not to sleep through my exam(s)
- Read this issue of **mathNEWS** over and over again until v142i1 comes out in January
- 7… I need to remember the number 7
- Troll everyone with my Reddit shitposting
- Do some extra practice problems
- Stay hydrated, because I REALLY don't get enough water
- Reflect on all my past mistakes this term
- Run around like a maniac
- Be a responsible and mature student
- Attend **mathNEWS** EOT
- 42… I also need to remember the number 42
- ~~**<u>Study the stuff that will be tested on my exam</u>**~~ (this is probably the most important one, so it is further emphasized with **~~)
- SHOW MY FUCKING WORK BECAUSE PART MARKS WILL SAVE ME
- Ask my prof and TAs for help during their office hours
- Hold a funeral shower with my friends for my impending doom
- Think about ways to make money to pay next term's tuition
- Your credit card number… I definitely need to remember YOUR credit card number
- Create the next big meme
- Execute my revenge against the Engineers for stealing the Log
- Party so hard at my friend's study party that the numbers start speaking to me
- MAKE SURE MY EXAMS HAVE MY NAME ON THEM

The Wisdom of the Ancient Ones and the Fool

Ignore everything else I just said.

PROF. MICHAEL WALLACE

HOW DO YOU CALI?

"Congratulations on a match! (Co-op message)"

"CECA Message — Next Steps J1 Visa"

"Webinar — Working & Living in San Francisco"

"Welcome to the West!"

So, yay!? I've taken the horrible idea to go Cali ^ Bust and got Cali. I have now become a living meme.

But unfortunately, this isn't the finish line. Having a work term in the USA leads to having to deal with sorts of new and exciting problems.

To start with, we can talk about visas. Unlike working in Canada, working in the USA involves having to submit paperwork which has lead times measured in months and multiple trips across the border. There's nothing more slow than the government, of course. So it needs to be done as early as possible. How early? Matching is on Wednesday and the suggested date to submit your paperwork is Thursday. And of course, everything needs to be handled manually as visas are literally a monopoly. Yay for non existent market forces!

After sending off my application, I get to be kept in suspense for two entire months. The best part is when you don't know if you have been approved until the day before you have to leave.

Then, there's housing. Remember when spending $800 a month for an ICON rental was considered bad? Well, in Cali, housing demand is insane. Monthly rent starts at about $2000 and only goes up. And that assumes you lucky enough to find a place. Remember, it's a six hour flight away, so you need guess everything though the internet. And if that wasn't bad enough, some areas apparently are landmines — "Go here if you want to see a shooting every monday".

And this doesn't even begin to cover the entire list of things you need to do. Credit Cards, SIN, currency exchange: going to Cali is a box of active landmines. Aren't you glad for the hype now?

(Cali =? bust)

TIL: A GROUP OF GEESE FLYING TOGETHER IS CALLED A "PLUMP"

Now you've learned it too! It's bound to be true because Wikipedia told me so, and it had a citation.

Narf Dert

THE REVOLUTION OF OUR TIMES

Even in a country renowned for peace and safety, I am suffocated by fear for my own safety.

Night and day, it is as if my stream of consciousness is an effervescent cocktail of fear, anxiety and depression. Every waking free moment — away from school, homework, and family — my thoughts round back to the place I once called home, Hong Kong.

—

For the majority of my life, I have identified as a Canadian.

And yet, at the core of my roots, I am an immigrant. My family travelled from Hong Kong for my health. My parents threw away the safety of the home they knew, the jobs they had, and the lives they had built for themselves. They threw it all away for my sake.

Growing up, I wondered if things would have been easier had we stayed in Hong Kong. My parents wouldn't have had to face unemployment, we wouldn't have struggled to learn English, and I wouldn't have lived everyday feeling as if I was a burden to my parents.

But now, I am grateful. Every day I am grateful for the life I am able to lead. I am studying at the university of my dreams, in the program I have idolized since the age of 8. I am part of communities that care for me. I am involved and educated about the world around me. I am able to live without the fear that the government I live under does not care for me.

—

Through a screen, I watch as fires start on the street I used to live on.

I watch as peaceful protestors are assaulted by tear gas that turns into a fiery inferno under the Hong Kong tropical heat.

I watch as police threaten to harm, sodomize, and kill citizens.

I watch as people being arrested shout their names so their deaths are not masked as suicides.

I watch as millions who live in a place I used to call home defend and destroy their own city.

I watch, paralyzed with fear as I sit in my bed, thousands of miles away.

—

The violence in place does not only affect those enforcing and suffering from it. The radical violence has entitled others to voice their own aggressive opinions. Those who oppose our pro-democratic political views taunt us as we defend our future. They laugh as we fight for our democracy while reaping the benefits of democracy. They say our artistic interpretations infringe and insult their culture. They say our crowds are nothing compared to theirs. They say we are one country.

Time, in its eternal existence, will continue to march on past my time on this earth. Regardless of the magnitude of importance, my time on Earth is a part of history.
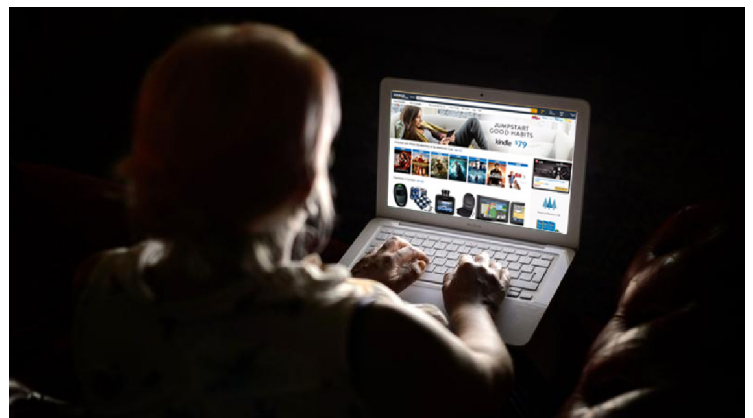
—

Our history is our narrative. Our past has been written, our present is unfolding, and our future is promised. We cannot change what has happened — we cannot change the past. But the course of history is undetermined, it is what we make of it.

My parents and I are Canadian citizens, we are immigrants, and we are Hong Kongers. My parents have spoken up for what they believe is right. They continue to research and follow the news in Hong Kong and participate in peaceful protests for democracy. They have chosen what they want their history to look like.

Now, it is my turn. I want what is happening in Hong Kong to be known. I acknowledge that I am biased due to my heritage; nonetheless, I urge you to read and research what is happening in Hong Kong. Understand why people are protesting, willing to become martyrs, and fighting for *the revolution of our times.*

Eggo_Chuggo

"IT'S SO GREAT TO BEAT THE BLACK FRIDAY CROWDS", SAYS WOMAN WHO HASN'T LEFT HOUSE IN WEEK

UW Unprint

JAO VERSUS KEN: A REFUTATION

In the previous issue of **mathNEWS**, an article was published attempting to answer the timeworn question: "Who would win in a fight, David Jao or Ken Davidson?". In the aforementioned article, the author, jeff, posits that Davidson's sandals, squash ability, and chalk would be sufficient to fell Jao. However, its insufficient proof renders said article merely sensationalistic and overblown conjecture (of course Jao has supersingular isogenies — he's shown me like 9 of them himself). Below, a comprehensive refutation in favour of Professor David Jao is presented.

CHALK

While Ken has proven to be a formidable adversary while equipped with the rational chalk, he would never get the opportunity to so much as unsheath it. With the sheer speed at which Jao calculates supermagic boxes, by the time Ken could even reach for its holster, Jao would already have him ensnared in a supermagic tesseract secured with a cryptographically unbreakable lock. From here, Ken could easily be transported to Jao's closet-office, which Jao would unhitch from reality quark by quark to be forever lost to the ether.

SANDALS

Even if Ken managed to get Jao into sandal stomping range, Jao's cybertruck-esque build allows him to tank even the most devastating blows. Unflinching, Jao would counter the stomp, casting a worldsundering ASCII block ■ smash. Although Ken might be able to parry the blow and attempt a riposte, Jao's Harvard education in optimization would leave him two steps ahead of Ken, lending him just enough time to awaken his victory-cinching ultra instinct form.

SQUASH

While I'm willing to acquiesce Ken's squash-attained strength, Jao is an internationally-revered badminton transcendent with a ruthless enough smash that it may as well be interdimensional. Moreover, since "there is no legal limit on acceleration" (u/djao, 2019), if put on the back foot in a fight against Ken, Jao would simply employ his Tesla to slip into a fourth-dimensional fundamental parallelepiped. Since Ken is unable to access the fourth dimension, Jao would be free to build up enough acceleration to cause an 80-centillion zettanewton-producing collision with Ken's squash racket, splintering it into a fog of unrecoverable smithereens. Without his weapon of choice, Ken would be put at a sufficient enough disadvantage that Jao's victory would be all but assured.

CHRONOMANCY

On top of having an answer to each of Ken's abilities, there's strong evidence that David Jao knows chronomancy. Maintaining an average Piazza response time of 3 minutes while simultaneously dishing out and marking weekly all-nighter-inducing assignments would be nigh impossible for anyone bound by the natural laws of physics. If it could be confirmed that David Jao actually was a chronomancer, Ken would stand absolutely zero chance. Unfortunately, this is still conjecture until someone catches Jao underneath his rock-climbing wall reciting vaguely Japanese-sounding incantations to appease his time-gods.

Corollary: In a battle between Jao and Ken's TAs, Jao's would trivially win. Peerless in his mastery over the p-adic numbers, Andre would incapacitate all Nick Manors in a single, deftly-woven three-strike barrage.

jeff, the Sword of Damocles looms; let slip the horse's hair.

supermagictesseract

INTERN DIES AFTER BEING LEFT TOO LONG IN HOT MEETING

TORONTO — Toronto police are urging the public to take caution after an intern was found dead after being left too long in a hot meeting. When police found him, the victim had been dead for hours. The coroner's office reported that "the deceased had suffered for hours before he died." Police confirmed that there are marks present on the doorknob consistent with trying to force an exit from the dangerous meeting room.

The investigating officer had harsh words for those involved: "Let me be clear, this death was preventable," he said. "This was nothing more than a product of carelessness. The negligence required to leave someone in a hot meeting for hours on end, is, in my opinion, criminal." Safety expert Robert Jimenez echoed those concerns: "People don't think it's dangerous, but in certain meeting rooms, the temperature can reach fatal levels. This case was especially egregious. Not a single window was opened, and the AC was left off the whole day." He added, "The only food available for the victim was bad coffee and stale donuts. How can anyone survive under these conditions?"

The company responsible defended themselves, stating that while the accident was tragic, it could have happened to anyone. As the company spokesman said, "While we are deeply sorry for what happened, this was an accident, plain and simple. Who hasn't forgotten an intern in their meeting, even just for a little bit?"

To prevent similar incidents, doctors recommend that interns wear loose-fitting clothing, be given bowls of water at all times, and limit meetings to two hours or less.

UW Unprint

mathNEWS isn't a cult. We just lure people in with free pizza and trap them in our office. Come by to get a taste!

A mathNEWS ~~CULT LEADER~~ EDITOR

Have a penchant for dry wit and self-deprecating humour?

A mathNEWS Editorship is the ideal way to waste that talent! Apply today!

AN OVERLY-JADED
mathNEWS EDITOR

You should ~~write~~ be an editor for mathNEWS.

(I swear it's not as bad as I make it sound.)

A mathNEWS EDITOR WHO WANTS
TO ~~GET THE HELL OUT OF THIS
MADHOUSE AND RUN~~ DEFINITELY
SECURE THE FUTURE OF THE PAPER

Please apply. We really need editors.

Every issue we don't get enough, we duplicate this page.

A 100% DESPERATE mathNEWS EDITOR

PRELUDE

gridCOMMENT *141.6*

zzz…

zzz…*pop* *yawn* That was a nice nap… Wait, where am I? Everything seems dark… *turns on phone*

What is this? "**mathNEWS** — MC3030" written on the walls? Why are there various **gridWORD** solutions in front of me? And why are my legs chained together?

Today sure isn't going well. If anything, I hope these gridWORDs can help me get out of this prison cell. It appears that each of them has a solution to last issue's **gridQUESTION**, which is "What advice would you like to give to our incoming **gridMASTER**"?

…**gridMASTER**?! That's me? In that case I'm never escaping… Let's at least read through the submissions to see if anything can help my perilous predicament. There appears to be three submissions. In no particular order:

- Rubber Soul: "Have fun! You're gonna do great!"
- Apple Chips: "Be creative with your abbreviations. Lazy abbreviations are Imprint's job!"
- Team MathSoc (0015100, Saratoga, RewardingGoblin, AlphaTangoMango, waldo@<3. LE-GASP.ca): "Use DuckDuckGo"

I appreciate Rubber Soul's optimism and would have certainly helped improve my mood, but my condolences that it wasn't most correct. Of the other two that were entirely correct, I think Apple Chips has the better advice.

[Author's Note: You know the drill, go to MC 3030 and bug the editors for a prize. Boilerplate boilerplate.]

While I'm unsure how abbreviations would help me, I feel as though it would help me more than simply switching my search browser. In the middle of pondering for my search of cute abbreviations, my phone buzzes, a sound that fills the prison with despair. On it, it announces: "v141i6 **gridWORD** due at 12/3, 12:00 pm!"

Being tired from all the aforementioned incidences, I snatch a random previous **gridWORD** from v131i5, submit that one to bid more time for my search at a breakout opportunity.

Suddenly, the door opens.

(To be continued at some arbitrary future issue)

Solar Flare

[Author's Note: For newcomers to **mathNEWS**, since issue 6 features no prizes, **mathNEWS** releases an old **gridWORD** and you would solve it for the spirit of solving it. In fact, no need to submit this to the **BLACK BOX**. The answers to this one is included next to i5's solution. In the spirit of reruns, the clues' typos were intentionally left unfixed. Also, 11-Down's clue refers to 56-Down, not 56-Across. Clues with a cross are 'cryptic clues', which means the correct answer are an anagram to the answer to the clue provided. And if you would like a **gridQUESTION** to ponder over because you're some **gridQUESTION** lover, it's "What would be your strategy to get out of a very dark room?"]

ACROSS

1. This African capital is named for the antelope which used to roam the hills nearby (7)
8. This act of desctruction was made an international crime in 2010 (7)
15. This adjective describes Sacajawea, Ezra Pound, and Sarah Palin (7)
16. Series of prayers, usually for renewal, held over nine days (7)
17. Crowds (7)
18. Passage, such as that of being in front of something larger (7)
19. This river which originates outside Dijon boasts 201 crossings (as of printing) (5)
20. Sköll or Hati (4)
22. Rubbish! (4)
23. If you had another of the vase bearing the name of this city, they would be technically these (4)
24. Moisten (5)
25. This 19th century Norwegian mathematician work plays a role in modern quantum mechanics (3)
26. This term is only correctly applied to women (3)
27. Eden (6)
28. † Me and alien collide (4)
29. Flavourings (8)
31. Perhaps the ancestor of the elves at Christmas, these gnome-like figures may serve as guardians of the farmstead (5)
32. An iron and coal rich region which was integral to great strife (4)
33. Instead of being composed of 11-Down, these are divided into fils, which serve the same purpose (4)
35. The endpoints of the major axis, these help ameliorate the cold of Winter and the heat of summer in the Northern Hemisphere. (5)
38. There are plenty of societies in the present who try and do this to the past (8)
42. In Scotland, this might be described as a "strath" (4)
43. God of the rains (6)
45. A Canadian tank used in the Second World War (3)
46. They traditionally come in red and blue varieties (3)
47. Angiotensinogenase (5)
48. Applied to wattle (4)
49. Either temples or stews (4)
51. The quantity of effort put into this clue (4)
52. This with its successor, gives first-years nightmares (5)
53. The traditonal fare to cross is an obol (7)
55. Hematoma of tissue (7)
57. It's flowing with the wind (3,4)
58. Opposite of 40-Down (7)
59. Mexican rectangular woven blankets (7)
60. 3,4-Methylenedioxy-methamphetamine (7)

DOWN

1. It is said that they grow additional tails after a hundred years (7)
2. † Sticks notices around this place (7)
3. Members of this US branch are "always faithful", as per thier motto (7)
4. Loudness levels; a negative score on this would be inaudable (5)
5. Prime (1-3)
6. Something a bad player might blame thier loss upon (4)
7. You, provided that you submit this puzzle (8)
8. Depending on where you are, this could be the main thing, or the thing just before it (6)
9. Legend has it that these dogs were once the steeds of the fae (6)
10. E.g. Advent Children, Hellsing Ultimate (3)
11. The country 1-Across is in discontinued these in 2013, while 56-Across still uses them (4)

GRIDWORD

12. † foot liners in before flatfish (7)
13. Flowers which traditionally represents innocence, purity, or simplicity (7)
14. One who believes that art should be for art's sake (7)
21. Performs arithmetic (4)
24. He goes with Messrs Gödel and Escher (4)
27. This e-mail and news client was originally released in 1987 (4)
28. ⅓ of a league (4)
30. This lake was likened to a cat, for its unpredictable nature (4)
31. An ultra-violent 1988 arcade game which was later given a remake in 2005 (4)

33. † Can be depended on to upset Blair Lee (8)
34. Greek image, arrogated by the modern world to something not as lofty (4)
35. † A start to five such letters heard in confessions (7)
36. One of the "holy grails" for alchemists of yore (7)
37. Originally meant "to slide", this word today can also be used to mean "to glide" (7)
38. What too many **mathNEWS** writers do in lieu of satire (4)
39. This body of water used to have over a thousand islands which dot its interior, of which it was once named (4,3)

40. About 62.8? (7)
41. After Hong Kong was returned to China, many countries simply renamed these to "consolates" (7)
43. The first (practical) electronic amplifer, its invention allowed for amplified radio technology (6)
44. Freetown money (6)
48. Follower of the Chinese Church of Virtue (5)
50. Bristle (4)
52. Simon and Robin; Batman and Garfunkel (4)
54. You might be on your way to 53-Across after this (3)
56. A large bird (3)

lookAHEAD

SUN DEC 8	MON DEC 9	TUE DEC 10	WED DEC 11	THU DEC 12	FRI DEC 13	SAT DEC 14
	Grace Hopper's 113th birthday.	Ada Lovelace's 204th birthday.		Due date for Winter 2020 fees.	Late fees for Winter 2020 begin.	

SUN DEC 15	MON DEC 16	TUE DEC 17	WED DEC 18	THU DEC 19	FRI DEC 20	SAT DEC 21
		National Maple Syrup Day.			Co-op work term ends.	On-campus examinations end.

THIS WEEK'S gridSOLUTION

K	A	M	P	A	L	A		E	C	O	C	I	D	E
I	D	A	H	O	A	N		N	O	V	E	N	A	S
T	H	R	O	N	G	S		T	R	A	N	S	I	T
S	E	I	N	E		W	A	R	G		T	O	S	H
U	R	N	S		B	E	D	E	W		L	I	E	T
N	E	S		G	A	R	D	E	N		M	E	E	T
E	S	S	E	N	C	E	S		N	I	S	S	E	
	R	I	S		R	U	H	R		R	I	A	L	
A	P	S	I	S			R	E	C	R	E	A	T	E
V	A	L	E		T	L	A	L	O	C		R	A	M
O	N	I		R	E	N	I	N		D	A	U	B	
W	A	T	S		I	O	T	A		D	E	L	T	A
A	C	H	E	R	O	N		B	R	U	I	S	E	S
L	E	E	T	I	D	E		L	O	O	S	E	N	S
S	A	R	A	P	E	S		E	C	S	T	A	S	Y

LAST WEEK'S gridSOLUTION

K	C	B		A	S	S	A	Y		M	T	B	
N	A	E		S	O	A	P	O		P	E	R	A
H	A	R	E		P	A	N	E	G	Y	R	I	C
O	P	P	O	S	E	R	S		H	A		H	A
S	P	A	R	T	R	E		D	I	M	S		Y
T	E	R	C	E		A	R	K	H	A	M		
A	R	K	H	A	M		I	K	A	T		S	O
			S	O	L	A	C	E			G	O	G
	T			R	E	D	S	T	A	R		L	H
		E	R	O	S			A	B	A	R	E	S
D	Y	N		S	U	C	C	E	S	S	O	R	
A	B	D	S			S	O	L	S	T	I	C	E
W	I	N	T	E	R		N	O	R	M	A	L	I
			S	T	I	F	F	E	N	E	D		
			K	E	A		T	I	G	R	E		